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Sea Dayak Diet: A Longhouse Survey

by

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During the last two and a half years I have carried out several tours of Sea Dayak areas in the Second Division visiting three or four houses each day. It was soon realised that such tours furnished only very superficial information regarding the general level of health and nutrition of these people and the prevalence of disease from which they suffer. The present study was undertaken to enquire into these questions more closely.

Rumah Bujak at Nanga Pruan was chosen for the study. The reasons for this were its proximity to Simanggang and the fact that this house is fortunate in having a very active, enterprising headman so that willing co-operation from the people of the longhouse was to be expected throughout the period of study.

From the 2nd February to the 29th November, 1958, the longhouse was visited every Saturday or Sunday by a team usually comprising the Divisional Medical Officer, a hospital assistant, laboratory technician, one or more hospital attendants and one or more trained *ulu* dressers. Sick people were examined each week, either treated on the spot or sent to Simanggang for outpatient or inpatient treatment as indicated. In addition the investigations to be described below were carried out during these weekly visits.

Rumah Bujak, Pruan

Before presenting the results of the study a brief description will be given of the longhouse and the way of life of the people who live in it.

The people of Rumah Bujak come originally from Sungai Pinggai on the Undup River. The Undup is a moderately large left branch of the Batang Lupar, the mouth of which is about twenty minutes' journey by outboard upriver from Simanggang. Sungai Pinggai is a further three hours' journey up the Undup by outboard.

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175 During the occupation the Japanese cut a channel through
[133] the narrow waist of a *tanjong* downriver from Simanggang. As a consequence water was diverted from a large loop of the river which dried out leaving an area of very fertile padi land. The people of Rumah Bujak settled on this land in 1943.

[423] After the occupation disputes arose regarding right of tenure of land on which the people of Rumah Bujak had settled. Several legal actions arose, as a result of which the people of Rumah Bujak were allowed to remain where they were. They also retain the rubber gardens at the site of their old house at Sungai Pinggai.

342 The present house was built in 1946. Several *langkaus* (temporary dwellings) were built alongside the house in 1955.

The original house built at Pruan contained 19 doors. Since its completion 11 *langkaus* have been built at the ends of the original longhouse.

162 The population of the longhouse was 169 at the start of the
621 investigation. During the period of investigation there were five births and one death. The death was that of a monster shortly
165 after birth, following a pregnancy complicated by hydramnios.

361 The house is built on low-lying tidal swamp. On two or three days each month the ground under and about the house is
356 flooded at high tide. The rooms are small, dark and hot. Some are kept moderately clean but some are very dirty. The majority
342 of rooms have separate kitchens.

231 Animals and poultry are reared under the house. The ground underneath and around the house is liberally strewn with
364 rubbish of all descriptions. There is no formal system of sewage
514 disposal. The occupants of the house defaecate and micturate through holes in the verandah and at the rear of the rooms in the time honoured fashion. Faeces are devoured by pigs and
[231] poultry.

Agriculture

241 The people of Rumah Bujak own extremely fertile swamp
433 padi land. They grow sufficient rice for their own needs and

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a surplus which they sell to the bazaar. The padi is planted in July and August and harvested in February and March. They grow vegetables and fruit around the house and along the bunds between the padi fields, partly for their own consumption and partly to sell in the bazaar. They rear pigs and poultry and own five head of cattle comprising one bull and four cows.

When not employed in padi cultivation and jobs about the longhouse the people spend a large portion of each year at Sungai Pinggai tapping rubber. While so employed they live in their rubber gardens for days or weeks at a time.

Social Pattern

The situation at Rumah Bujak, where the people live part of the year in the longhouse and part of the year in *langkaus* a considerable distance from the longhouse, travelling between the two places as required is the rule rather than the exception in the Second Division. For example many Sea Dayaks in the Saribas and Rimbas Rivers have their longhouses upriver and swamp padi fields downriver, travelling between the two as required.

In short the Sea Dayak in the Second Division at least is semi-nomadic. This factor would assume great importance if medical surveys or the attack on specific diseases by mass drug administration were being planned, where it is necessary to have as near one hundred per cent of the population as possible in the longhouse at the same time. If a wide area were being covered by such a campaign, no particular season of the year would be ideal for all parts of the area in which the campaigning was being carried out.

The Sea Dayak is understandably reluctant to curtail his movements to and fro, as they have usually an agricultural motive and on agriculture his main source of livelihood depends. The only answer to this problem would be intensive propaganda before a medical campaign enlisting the enthusiastic help of the administrative authorities.

This problem of continuous migration kept cropping up throughout the present study. It made investigations more laborious and time-consuming than they would otherwise have been.

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Living as they do near the bazaar, contact with it has necessarily influenced the way of life of these people considerably. All the men have short hair and many of the women have waves. They wear a Malay type of dress or European clothes.

The majority of the people in the house profess Christianity. The majority of children in the house have for many years attended the mission school in Simnaggang. The majority of people in the house are able to read and write. Several members have attained a fairly high standard of education and are employed in Government Service.

* * *

To summarize the background briefly: Rumah Bujak is an average longhouse in the lower Batang Lupar as regards position, standard of construction and state of cleanliness. The people have attained a high level of prosperity on Sea Dayak standards. As a result their standard of living is way ahead of longhouses in many other areas of the Second Division.

DIETARY SURVEY

Method

As a sufficient proportion of the population of the house were able to write, each room was asked to keep a diary of everything they ate and drank at every meal for one week, starting on the 23rd March, 1958. At the end of this period the results were collected and the weight likely to be consumed by an average adult male was assigned to each food commodity. The estimate for rice was the most accurate since it is customary at this longhouse to measure the rice used for each meal in cigarette tins full. A portion of rice cooked for each meal is wasted but as this must be very variable no allowance was made for it; so that as rice forms usually a high proportion of the daily food intake (see below) the results will tend to err on the high side. An attempt was made to estimate the weight of other food commodities consumed without bias, so that errors would be mutually exclusive and not cumulative.

Having estimated the weight of each food commodity, its protein, fat, carbohydrate and calorie content was calculated from

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one food table (F.A.O. Nutritional Studies No. 3) and its iron content from another (McChance and Widdowson, 1946). An exception was the iron content of rice which was give the value reported by Rosedale for hulled Malayan rice (Rosedale, 1939). The food values for peculiar local foods were calculated from the nearest equivalent in the tables. Where this was not possible (e.g. for certain fruits and vegetables) the values under unspecified food (tropical areas) and unspecified fresh vegetables were used.

The daily intake of protein, fat, carbohydrate, iron and calories was then estimated for each of the seven days for an average adult male of each door and from this the average daily intake of protein, fat, carbohydrate, iron and calories and the range for each value was estimated.

Finally the percentage protein, fat, carbohydrate, iron and calorie intake obtained from rice was calculated.

Results

The results obtained from 25 rooms were accepted for analysis. Those obtained from 2 rooms were rejected because they were thought to be incomplete. Three rooms did not take part in the investigation because they were not in the longhouse at the time when it was carried out. Table I sets out one of the poorest diets analysed. Table II sets out one of the best diets analysed. Table III sets out the most monotonous diet in the series. The average, maximum and minimum daily intake of proteins, fats, carbohydrates, iron and calories for an adult male in each room is set out in Table IV. Table V shows the proportion of the daily food intake obtained from rice.

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TABLE I

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AN EXAMPLE OF A POOR DIET CONSUMED BY AN AVERAGE ADULT MALE OF DOOR 1. (SEE TABLE IV).

Day	Breakfast		Lunch		Supper	
	Commodity	*Amount*	*Commodity*	*Amount*	*Commodity*	*Amount*
1.	Rice Salt fish	8 oz. 2 oz.	Rice Trongs ("egg fruit")	8 oz. 2 oz.	Rice Pumpkin leaves	8 oz. 2 oz.
2.	Rice Tapioca leaves	8 oz. 2 oz.	Rice Salted Shrimps	8 oz. ½ oz.	Rice Tapioca leaves	8 oz. 2 oz.
3.	Rice Pumpkin	8 oz. 2 oz.	Rice Pumpkin	8 oz. 2 oz.	Rice Pumpkin	8 oz. 2 oz.
4.	Rice Daun Changkok (green leaf vegetable)	8 oz. 2 oz.	Rice Daun Changkok	8 oz. 2 oz.	Rice Ikan Betok (fresh water fish)	8 oz. 4 oz.
5.	Rice Cucumber	8 oz. 2 oz.	Rice Cucumber	8 oz. 2 oz.	Rice Trongs	8 oz. 2 oz.
6.	Rice Ikan Pusu (variety of salt fish)	8 oz. 1 oz.	Rice Daun Changkok	8 oz. 2 oz.	Rice Daun Changkok	8 oz. 2 oz.
7.	Rice Prawn paste	8 oz. ½ oz.	Rice Pumpkin	8 oz. 2 oz.	Rice Pumpkin	8 oz. 2 oz.

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TABLE II

AN EXAMPLE OF GOOD DIET CONSUMED BY AN AVERAGE ADULT MALE OF DOOR 5. (SEE TABLE IV).

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Day	Breakfast		Lunch		Supper	
	Commodity	*Amount*	*Commodity*	*Amount*	*Commodity*	*Amount*
1.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Fresh fish	2 oz.	Fresh fish	2 oz.	Cornbeef	2 oz.
	Paku kubok (wild vegetable)	2 oz.	Buah Retak (long beans)	2 oz.	Tapioca leaves Ikan Sepat (sea fish)	2 oz. 2 oz.
	Salt fish	2 oz.				
2.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Cornbeef	2 oz.	Yams	3 oz.	Sardines	½ oz.
	Daun Changkok (green leaf vegetable)	2 oz.	Salt fish	2 oz.	Pork Tapioca leaves	3 oz. 2 oz.
	Salt fish	2 oz.			Sting ray	2 oz.
3.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Mushrooms	2 oz.	Cucumber	2 oz.	Daun Bayam (green leaf vegetable)	2 oz.
	Trong	2 oz.	Sardines	½ oz.	Salt fish	2 oz.
	Ikan betok (fresh water fish)	2 oz.	Snails	1 oz.	Sardines	½ oz.
	Prawn	3 oz.	Ikan pusu	1 oz.	Pork	3 oz.
4.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Tapioca leaves	2 oz.	Cabbage	2 oz.	Cabbage	2 oz.
	Cornbeef	2 oz.	Fowl	5 oz.	Curried fish	2 oz.
	Salt fish	2 oz.			Sting ray	2 oz.
5.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Salt fish	2 oz.	Cucumber	2 oz.	Cabbage	2 oz.
	Trong	2 oz.	Sardines	½ oz.	Pork	3 oz.
					Prawns	3 oz.
6.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Trong	2 oz.	Trong	2 oz.	Pumpkin	2 oz.
	Pork	3 oz.	Pork	2 oz.	Sting ray	2 oz.
			Cabbage	2 oz.	Tapioca leaves	2 oz.
7.	Rice	8 oz.	Rice	8 oz.	Rice	8 oz.
	Buah gerok	2 oz.	Pork	3 oz.	Mushrooms	2 oz.
	Prawns	3 oz.	Cucumber	2 oz.	Daun Changkok	2 oz.
	Ikan betok	2 oz.	Sardines	½ oz.	Prawns	3 oz.

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TABLE III

THE MOST MONOTONOUS DIET IN THE SERIES.

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Day	Breakfast		Lunch		Supper	
	Commodity	*Amount*	*Commodity*	*Amount*	*Commodity*	*Amount*
1.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Fresh fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Fresh fish Daun Changkok	8 oz. 2 oz. 2 oz.
2.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Fresh fish Daun Changkok	8 oz. 2 oz. 2 oz.
3.	Rice Fresh fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.
4.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.
5.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.
6.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.
7.	Rice Daun Changkok	8 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.	Rice Salt fish Daun Changkok	8 oz. 2 oz. 2 oz.

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TABLE IV

ESTIMATED DAILY INTAKE OF PROTEIN, FAT, CARBOHYDRATE, IRON AND CALORIES FOR AN AVERAGE ADULT MALE AS CALCULATED FROM THE DIARY OF ONE WEEK'S FOOD CONSUMPTION

Door	Protein in grammes/day			Fat in grammes/day			Carbohydrate in grammes/day			Iron in m.grammes/day			Calories per-day			
	Min.	Max.	Average	Min.	Max.	Average	Min.	Max.	Average	Min.	Max.	Average	Min.	Max.	Average	
1.	50	67	57	8	12	9	551	558	553	22	23	22	2663	2784	2715	
2.	62	148	88	12	64	32	534	548	538	23	28	26	2632	3389	2855	
3.	74	107	90	11	110	39	533	545	538	23	28	26	2630	3575	2943	
4.	61	131	94	16	107	49	533	546	481	18	30	26	1825	3587	2807	Two breakfast missed.
5.	93	128	107	22	112	58	537	556	544	27	35	25	2802	3677	3168	
6.	78	93	87	10	73	47	556	544	547	23	27	30	2658	3251	3019	
8.	66	106	87	101	104	102	528	473	480	23	30	26	3110	3456	3332	Very high pork consumption.
9.	58	105	85	9	110	32	541	559	554	26	30	26	2685	3349	2981	
10.	70	102	84	15	103	66	539	575	560	26	30	28	2895	3756	3379	
11.	55	76	64	8	31	11	479	501	487	20	23	27	2399	2681	2498	
12.	70	89	81	9	57	19	535	556	540	24	29	21	2673	3230	2776	
13.	57	94	78	10	61	19	533	540	536	24	27	26	2543	3062	2769	
14.	62	99	78	13	55	22	537	556	545	25	28	26	2633	2960	2755	
16.	75	98	85	10	59	19	533	545	539	24	26	26	2624	3081	2823	
17.	91	97	95	12	16	13	537	537	537	26	27	25	2702	2706	2705	The most monotonous diet in the series.
19.	63	98	80	11	105	40	533	542	538	23	28	27	2567	3505	2911	
20.	52	89	72	8	61	18	541	636	566	25	27	25	2577	3120	2768	
21.	52	71	63	8	17	12	531	537	535	23	25	26	2477	2675	2588	
22.	62	95	83	11	195	56	531	537	532	24	30	24	2551	4273	3024	
23.	60	108	73	11	32	16	531	557	539	23	30	26	2540	3015	2654	
24.	53	104	82	8	108	19	535	542	537	25	30	25	2496	3541	2795	
25.	52	81	65	8	14	10	535	561	543	24	26	27	2477	2653	2570	
28.	71	90	78	12	105	40	535	542	538	25	30	26	2626	3090	2886	
29.	52	81	66	8	12	10	534	558	539	24	26	25	2477	2714	2571	
31.	52	75	61	8	104	36	531	539	537	23	27	25	2477	3433	2775	

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TABLE V

PROPORTION OF DAILY FOOD INTAKE OBTAINED FROM RICE.

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	Percentage of daily intake obtained from Rice		
	Maximum	*Minimum*	*Average*
Protein	96	46	75
Fat	93	4	24
Carbohydrate	100	83	97
Iron	99	62	84
Calories	99	57	85

Comments on this Diet

Samson Wright (Wright, 1952) states that an average normal British diet contains daily 100 grammes of protein (410 calories), 100 grammes of fat (930 calories) and 400 grammes of carbohydrate (1,640 calories) giving a daily calorie intake of 3,000 calories. It will be seen from Table IV that few diets in Rumah Bujak approached this satisfactory standard.

Small groups of people have been kept in positive nitrogen balance for limited periods on less than 50 grammes of protein a day. The proteins in these experiments were, however, specially selected and of high biological value. On an ordinary mixed diet 80 grammes of protein daily would probably be satisfactory (Wright, 1952). This would apply particularly in the case of the people of Rumah Bujak, where a large part of the protein consumed is of vegetable origin.

Taking into account the crude nature of the analysis of the results in the present investigation, the diets or 5 doors (20 per cent) fall far short of this standard i.e. an average protein intake of less than 70 grammes daily.

Samson Wright considers that the fat content of the diet should be at least 75 grammes daily (Wright, 1952). Only one diet at Rumah Bujak exceeded this requirement and only one

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other even approached it. The other diets gave a very low daily fat intake. 146

Fat is required to enhance the calorie value of a diet without unduly increasing its bulk.

The daily carbohydrate intake exceeded in every case the average daily British intake of carbohydrate by amounts ranging from 80 grammes to 166 grammes. This probably represents an attempt to acquire calories which ought to be acquired in the form of fat. Anyone who has visited longhouses and watched the Sea Dayak at table must have marvelled at the huge platefuls of rice which are consumed in the process of assimilating this large quantity of carbohydrate.

To attain a calorie intake of 3,000 calories the food consumed must have a caloric value of 3,300 calories—as 10 per cent of the calories are lost in the process of digestion.

Only one diet at Rumah Bujak attained this level. Again taking into account the crude nature of the analysis of the diets and a daily calorie intake of less than 2,800 calories being considered unsatisfactory on British standards, then 11 (44 per cent) of the diets would be in this category.

The people of Rumah Bujak are on the whole shorter and lighter than the average British subject so that part of the deficit could be accounted for by a lower basal energy requirement, say 400 calories less as a generous estimate. This, however, leaves a further deficit in the 11 diets which is probably real and undesirable. The cause of this suboptimal calorie intake is probably the low fat content of the diet. The attempt to acquire calories in the form of carbohydrate is limited by the bulk of the food and is not completely successful. It is interesting that the only diet which exceeded the average daily British calorie intake also slightly exceeded the average daily British fat intake (Door 5, Table IV). [142]

A normal woman and a growing child require 15 mgs. of iron daily. Men require about a third this amount (Whiby and Britton, 1957). It is therefore evident that the average daily iron intake provided by all the diets in the present study is

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146 eminently satisfactory. This is due to the important place of rough milled rice in the daily diet, rice being very rich in iron.

To sum up these data, a significant proportion of the population of Rumah Bujak have a suboptimal daily protein intake. A significant proportion of the population have a suboptimal calorie intake due to the low fat content of their diet, they being unable to substitute sufficient carbohydrate for the fat deficit because of the large bulk that would be required.

These observations become very significant when it is remembered, as stated earlier in this paper, that the people of Rumah Bujak are relatively well-to-do and it is reasonable to expect that the diets analysed here are *the best obtainable in the Second Division.*

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